Patent Claims

1. A drilling machine for exploratory and productive wells, consisting of a base (1), a top drive (2), and a gripper (12), characterized in that the top drive (2) is arranged to be displaceable by means of a guide in or directly on the base (1) axially to the longitudinal axis of the base (1), and in that the gripper (12) is arranged to be movable perpendicularly to the axis of the base (1) for gripping and/or guiding, and in that a live ring (9) is connected to the base (1), the live ring (9) being arranged directly at the foot of the base (1).

2. The drilling machine as claimed in claim 1, characterized in that the base (1) is arranged to be displaceable.

3. The drilling machine as claimed in claim 1 or 2, characterized in that the live ring (9) has a through guide (8) through which is guided a cable (13) that connects the top drive (2) via a crown bearing (7) to a drawworks (17).

4. The drilling machine as claimed in claims 1 to 3, characterized in that means for pivoting the base (1) are arranged on the live ring (9).

5. The drilling machine as claimed in claim 4, characterized in that the means comprise a pivot bearing with a bolt (108) and a connecting member (109), together with a lifting apparatus (107).

6. The drilling machine as claimed in claims 1 to 5, characterized in that a winch (10) is arranged in the lower region of the base (1), the cable of the winch (10) being secured via a deflection roller (11) to the receiving frame (4).

7. The drilling machine as claimed in claim 6, wherein the winch (10) is driven by a drive unit (14), preferably comprising an electric motor with downstream transmission.

8. The drilling machine as claimed in claims 1 to 7, characterized in that the base (1) is connected via the live ring (9) to a rig floor (21), the drawworks (17) with a boggy truck (18) being arranged below the rig floor (21) and a iron roughneck (20) being arranged on the rig floor (21) or in the lower region of the base (1) above the rig floor (21), this iron roughneck (20) preferably being of slidable or pivotable design.

9. The drilling machine as claimed in claim 8, characterized in that the drawworks (17) is arranged in at least one subframe box (19) which supports the rig floor (21).

10. The drilling machine as claimed in claims 1 to 9, characterized in that a pipe handling device (23) is arranged adjacent to and/or below the rig floor (21) or adjacent to the base (1).

11. The drilling machine as claimed in claim 10, characterized in that the pipe handling device (23) consists of a truck (121) which is arranged to be displaceable on rails (24) and in that a pipe receiving unit (122) is arranged on the truck (122) and is mounted to be rotatable and/or pivotable in a vertical plane by means of a pivot device (123).

12. The drilling machine as claimed in claim 11, characterized in that the pipe receiving unit (122) comprises a gripper seating (124) and/or a retaining unit, preferably a gripper (125).

13. The drilling machine as claimed in one of claims 1 to 12, characterized in that a locking apparatus is arranged at the upper end of the base (1) and is connected to a steel structure, preferably a tower or a mast.

14. The drilling machine as claimed in one of claims 1 to 13, characterized in that the top drive (2) is arranged to be rotatable about a parallel axis of the base.

15. The drilling apparatus as claimed in one of claims 1 to 14, characterized in that a drum is arranged on or in the base onto which the flushing hose and/or the power and control lines are rolled up.

16. A drilling rig comprising at least two drilling machines as claimed in claims 1 to 15, characterized in that the drilling rigs are arranged to be alternately movable or rotatable or pivotable over the center of a well (130).

17. The drilling rig as claimed in claim 16, characterized in that two drilling devices (40, 41) are arranged substantially symmetrically to the center of the well (130).

18. The drilling rig as claimed in claim 16 or 17, characterized in that the pivotable drilling devices are connected to one another, the connection preferably being provided by means of a serrated chain or a cable or a chain.

19. The drilling rig as claimed in one of claims 16 to 18, characterized in that a steel structure is arranged between two drilling machines, to which steel structure the drilling machines can be reciprocally locked, the drilling machines being connected by means of cable or chain via a return point or a return roller which is arranged in the steel structure.

20. The drilling rig as claimed in claim 21, characterized in that a damping device is arranged on the support devices of the drilling machines or the steel structure, the damping unit preferably consisting of a hydraulic cylinder and a choke.

21. A method for sinking a well and installing pipework by means of a drilling machine as claimed in claims 1 to 20, characterized in that

a) the base (1) is prepared in the horizontal position to receive the pipe, the top drive (2) being in the upper position and the gripper (12) at approximately the same height as the pipes (25),

b) the pipe (25) is rolled onto or over the base (1) and then

c) the pipe (25) is gripped and held by the gripper (12), and then

d) by means of the top drive (1) and the handling device (5) which is preferably arranged below the top drive, the upper connection of the top drive (2) to the pipe (25) is produced, and subsequently,

e) the base (1) is raised by means of the lifting apparatus (107) to the vertical position, and

f) the lower connection between the pipe (25) and the pipe located in the well (130) is produced.

22. The method as claimed in claim 21, characterized in that, after the base (1) has been lifted into the vertical position, it is locked in a steel structure.

23. The method as claimed in claim 21 or 22, characterized in that method steps a) to f) are carried out in reverse sequence in order to remove pipes (25) and lay them on or in a pipe rack, the release of the connection replacing the production of a connection d) and f) and the lowering of the base replacing the lifting of the base (1)(e).

24. The method as claimed in claim 23, characterized in that, when the base (1) is locked in a steel structure, the locking is released.

25. A method for sinking a well and for installing pipework by means of a drilling machine as claimed in claims 1 to 20, characterized in that

a) a stationary base (1) is used and

b) the pipe (25) is removed from a pipe rack by means of a rail-borne pipe handling device (23) and moved toward the base,

c) the upper region of the pipe (25) being brought to the top drive (1) or the elevator (6) in such a way that the elevator (6) can encompass the pipe (25), and subsequently

d) the pipe (25) is encompassed in the upper region by the elevator (6) and in the lower region by the gripper (12), and then

e) the drive shaft of the top drive (2) is secured by screwing, and

f) then lowered and the connection is produced between the pipe located in the well (130) by means of the iron roughneck (20).

26. A method for sinking a well and installing pipework by means of a drilling machine according to one of claims 1 to 20, characterized in that

a) a base (1) which can be rotated about its longitudinal axis is used, and

b) is rotated over a collection point (28), the top drive (2) being located in the upper or middle region of the base (1), while, previously or simultaneously, a pipe (25) is conveyed to the collection point (28) by means of a pipe handling device (23), the latter preferably being rail-borne, and held ready there, and then

c) the top drive (2) and the handling device (5) connected thereto and the elevator (6) are lowered until the elevator (6) can encompass the pipe (25), and then

d) the elevator (6) encompasses the pipe (25) and the gripper (12) is moved sufficiently far out from the base (1) to encompass the pipe (25) and

e) the pipe (25) is lifted and the base (1) is pivoted over the well (130), where the pipe (25)

f) is connected by means of the iron roughneck (20) to the pipe located in the well and to the drive shaft of the top drive (2).

27. The method as claimed in claims 26 or 21, characterized in that the upper connection between the drive shaft of the top drive (2) and the pipe (25) is produced by means of a screwing and securing device or by means of the handling device (5) during the lifting and rotating movement.

28. The method as claimed in claim 26 or 27, characterized in that, in step a), instead of the base (1) only the top drive (2) is rotated about a vertical axis parallel to the longitudinal axis of the base away from the well center and positioned above a collection point.

29. The method as claimed in claims 21 to 28, characterized in that, first, the connection of the pipe (25) to the pipe located in the well and then the upper connection between pipe and drive shaft of the top drive (2) is produced.

30. The method as claimed in claims 21 to 29, characterized in that, in installation and removal operations, the pipe (25) is only suspended in the elevator (6) and is not connected to the drive shaft of the top drive.

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